Nic Roome Objectives

Objectives

1) Define Genetic Pool and describe how it relates to evolution- **Knowledge**

2) Describe genetic variation and explain how it relates to evolution- **Comprehension**

3) Describe single-gene and polygenic traits and explain their effects on evolution- **Comprehension and Knowledge**

4) Describe the trend of Polygenic Traits- **Comprehension**

5) Explain and compare the different kinds of selection- **Analysis**

6) Explain genetic drift- **Knowledge**

7) Apply the Hardy-Weinberg principle to genetic equilibrium- **Application**

8) Define genetic equilibrium and describe the 5 conditions required to maintain it–**Knowledge and Comprehension**

9) Define speciation and distinguish the different isolating mechanisms- **Knowledge and Analysis**

10) Describe examples of natural selection in nature- **Knowledge**

11) Explain speciation in Darwin’s finches- **Comprehension**

Unit Test- Evolution of Populations

Name

Date

Period

Circle the correct answer (2 pts each)

1) The collection of genetic information of the different alleles present in a population is the (1)

a. Mutation **c. Gene Pool**

b. Populous DNA d. Natural Selection

2) This kind of trait leads to 2 distinct phenotypes (3)

**a. Single-Gene** c. Mutation

b. Polygenic d. None of the above

3) The 2 main sources of Genetic Variation are (2)

a. Mutations and Single-Gene traits c. Gene Shuffling and Isolation

b. Isolation and Polygenic traits **d. Mutations and Gene Shuffling**

4) The number of phenotypes depends on how many genes control the trait. (3)

**a. True**  b. False

5) A graph of phenotypes of a polygenic distribution would look like (4)

**a. a Bell Curve** b. a Skewed Distribution

c. a Random Distribution d. an Asymmetric Distribution

6) A Widows’ Peak and attached ear lobes are examples of (3)

a. Recessive genes **b. Single-Gene traits**

c. Polygenic traits d. Mutations

7) The smaller the population the more the laws of probability hold true. (6)

a. True  **b. False**

8) The \_\_\_\_\_\_\_\_\_\_\_\_\_\_ states that allele frequencies in a population will remain constant unless one or more factors cause those frequencies to change. (7)

a. The Founder Effect b. Behavioral Isolation Effect

c. The Darwin Principle **d. The Hardy-Weinberg Principle**

9) A random change in allele frequency is called (6)

a. Gene Shuffling b. Isolation

**c. Genetic Drift**  d. Natural Selection

10) A polygenic trait has more phenotypic possibilities than a single-gene trait. (3)

**a. True**  b. False

11) If the allele frequencies do not change, the population will evolve. (7)

a. True  **b. False**

12) Which of the following are required to maintain genetic equilibrium? (8)

I. Random Mating

II. Small Population

III. No Mutations

IV. Climate Change

1. I, II, III, IV
2. II, and IV only
3. **I and III only**
4. I and IV only

13) When members of 2 populations cannot interbreed and produce fertile offspring it is called (9)

a. Behavioral Isolation b. Temporal Isolation

**b. Reproductive Isolation**  d. Geographic Isolation

14) If a fruit bearing tree dies it only effects the population of fruit eating birds. (10)

a. True  **b. False**

15) In the Galapagos Islands finch beaks have been dramatically \_\_\_\_\_\_\_\_\_\_\_ in size over time. (10)

**a. increasing**  b. decreasing

Match the following vocabulary words with their corresponding definition (1 pt each)

1) Disruptive Selection (5) \_**4**\_ a) the process by which heritable traits that make it more likely for an organism to survive and successfully reproduce become more common in a population over successive generations.

2) Speciation (9) \_**5**\_ b) A change in a sequence of DNA

3) Relative Frequency (1) \_**1**\_ c) Individuals at the higher and lower end of a curve has higher fitness than those in the middle

4) Natural Selection (5) \_**2**\_ d) Changes that lead to the formation of new successfully breeding organisms

5) Mutation (2) \_**3**\_ e) The number of times an allele occurs in a gene pool

Answer each question in complete sentences and to the best of your ability.

1) List the 3 ways natural selection affects the distribution of phenotypes and describe how they affect the population. (Draw distribution graphs to help). (5) (6 pts)

**Directional Selection- When individuals at one end of the curve have higher fitness than individuals in the middle or at the other end. Population shifts towards end of higher fitness**

**Stabilizing Selection- When individuals near the center of the curve have higher fitness then those at either end. Most of the population will be in the middle**

**Disruptive Selection- When individuals at the upper and lower ends of the curve have higher fitness than those in the center. If pressure continues there will be 2 distinct phenotypes.**

2) Define genetic equilibrium and explain 3 of the 5 conditions to maintain genetic equilibrium (8) (8 pts)

**Genetic Equilibrium is where allele frequencies remain constant over time.**

1. **Random mating- member of a population must have an equal opportunity to produce offspring with another in the population**
2. **Large Population- genetic drift has less effect on large populations**
3. **No immigration or emigration- will eliminate chance of new alleles being introduced or lost**
4. **No Mutations- Mutations create new alleles which could create a change in the allele frequency**
5. **No Natural Selection- all genotypes must have an equal opportunity to survive and reproduce**

3) Use the concepts of isolation to describe the speciation of finches Darwin observed. (9 &11) (6 pts)

**Original founding birds arrive on the island from the mainland, but cannot fly between islands so they are geographically isolated from the rest of their population. Over time the finches adapted to their new environment changing the gene pool to best survive their surroundings. Finches usually mate with birds with the same beak size so the 2 different gene pools don’t mate and become reproductively isolated. As time went on the environment continued to change which created a need for different phenotypes therefore new species continue to be created.**